



**Reply under 37 CFR §1.116 – Expedited Procedure – Technology Center 1793**

**PATENT**  
**Docket No. 58688US004**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant(s): Hauptmann et al. ) Group Art Unit: 1793  
Serial No.: 10/560,702 ) Examiner: James E. McDonough  
Confirmation No.: 1948 )  
Filed: December 13, 2005 )  
For: UNIFORMLY COLOURED CERAMIC FRAMEWORK AND COLOURING  
SOLUTION )

**DECLARATION OF Holger Hauptmann**

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Holger Hauptmann, declare and say as follows:

1. I am a co-inventor of the subject matter claimed in the above-identified U.S. Patent Application Serial No. 10/560,702, filed December 13, 2005.

2. I have read the Office Action mailed on January 8, 2009, and the documents cited therein, and make the following Declaration in support of the patentability of the claims.

3. It is important that the solution used adequately penetrate into the pores of the ceramic framework so homogeneity in colour can be achieved. To determine if chain length of PEG impacted this, we conducted further experiments using varying chain lengths of PEG as

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shown in the following table.

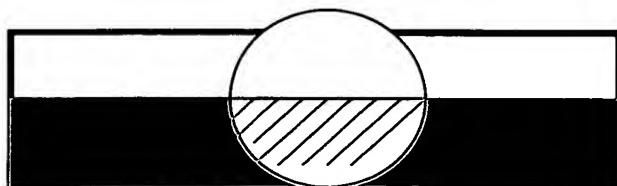
Chain Length / PEG-name (PEG XXX)	Test Number
PEG 600	FSP 47
PEG 600 PR	FSP 48
PEG 400	FSP 49
PEG 1000	FSP 50
PEG 3000	FSP 51
PEG 35000	FSP 52
PEG 6000	FSP 53

The master formulation for the test samples was as follows:

Raw Material	Weight %
Er-Solution (10% by weight Er)	14.0
Fe-Solution (2.1% by weight Fe)	25.1
Hydrochloric Acid (0.2n HCl)	60.4
PEG XXX	00.5

After stirring the components a clear solution was obtained.

4. Test samples (Discs made out of LAVA Frame – a commercialised presintered Zirconia blank) were soaked with solutions containing the different PEG's as shown in the following graphic. The soaking time was two minutes.



5. After this soaking time, the test samples were sintered via the Lava

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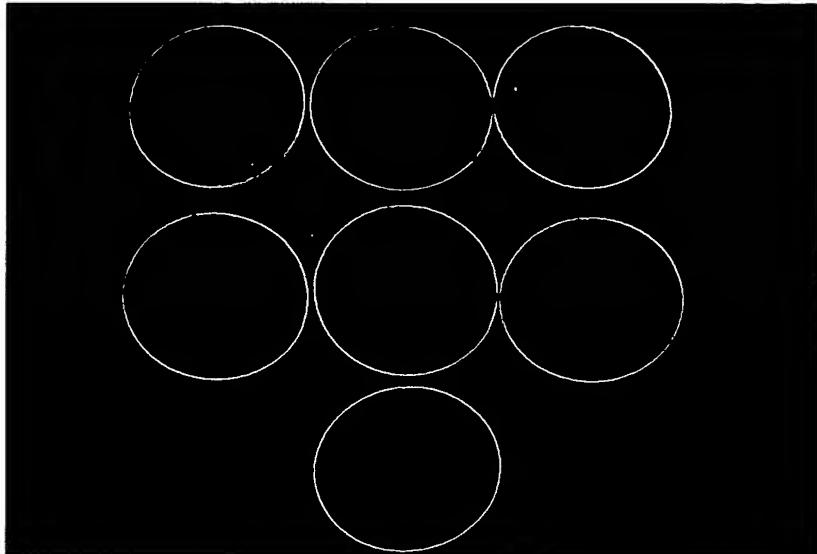
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sintering protocol described in the IFU (ramping up: 10 K/min up to 1500°C, at  $T_{max}$  the temperature will be held for two hours, no active cooling). The position in the kiln was also upright as shown in the illustration at paragraph 4.

6. The penetration of these solutions into the test bars was examined (see the following Figures P1-P3). Figure P1 shows an overview of the specimens after sintering. In Figures P2 and P3, a brownish boundary is clearly visible, except for sample number 52. In this sample, there is a smooth transition to the white area.



P1

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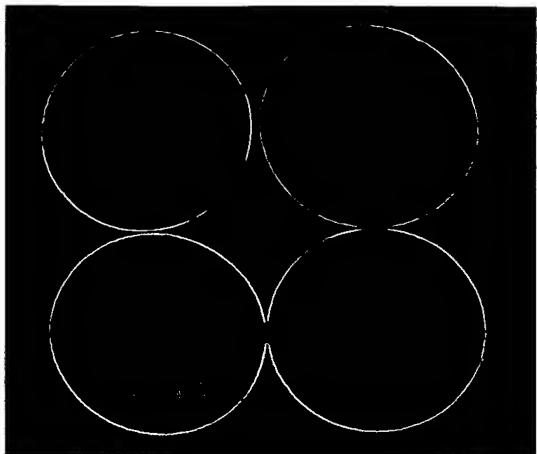
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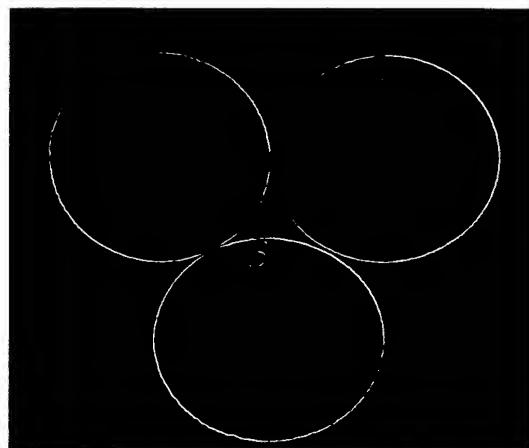
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P2



P3

7. The smooth transition between the white and coloured areas indicate that the best results can be achieved using PEG 35000 (sample number 52). That is, in this test, PEGs with lower molecular weights (samples 47 and 49) did not have as homogeneous a colour appearance as sample 52. Thus, if a solution is used containing a very low molecular weight PEG, samples are obtained showing a strip of more intense colour in the sample. This strip is a region where the colouring elements of the solution are somehow enriched relative to the other areas. This was not observed with the higher molecular weight PEG's (e.g., PEG 35000).

7. I further declare that statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Holger Hauptmann



Date